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Short communication

Development of relational database for assessment of distribution of area, production and productivity of major oilseeds (Linseed, rapeseed & mustard, niger and sesamum) in different districts of bastar plateau

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Abstract

In developing countries basic data are needed for formulating developmental plans and for subsequent assessment of their progress. Precise agricultural statistics are essential for policy-makers, administrators, and scientists concerned with planning and evaluation of agricultural investments (de Groote and Traoré, 2005). A relational database allows us to easily find specific information. The SQL is the foundation for all the popular database applications available today. Chhattisgarh is a predominantly tribal region in the eastern part of India. In order to get a good idea of how the production of crops has varied over the years, it is necessary to study its trend over the years. To depict the complete scenario, there is need of collecting and maintaining a relational database of area, production and productivity of major oilseeds (linseed, rapeseed & mustard, niger and sesamum) in different districts of bastar plateau.

Keywords: Bastar plateau region, major oilseeds (linseed, rapeseed & mustard, niger and sesamum), relational database, SQL

Introduction

Poor agricultural data can lead to misallocation of scarce resources and policy formulations that fail to resolve critical developmental problems (Kelly *et al.* 1995). The Relational Database Management System (RDBMS) technique, as introduced by E. F. Codd (1970), was used for development of database of the collected data for their fast and accurate retrieval as per the requisite query. In such a database the data are organized into tables by establishing relations among them through inner and outer joins of certain fields of database tables being related. This relational integrity gives the advantage of sorting and building completely new tables for required information from existing database tables and structured query language (SQL), which has become standard for database interoperability. Hence, the objective of study is to develop a relational database of area, production and productivity of major oilseeds (linseed, rapeseed & mustard, niger and sesamum) in Bastar Plateau region.

Material and method

Bastar plateau Agro-climatic zone of the Chhattisgarh state was selected as the study area for the present work. The Time series secondary data on area, production and productivity were collected for major oilseeds (linseed, rapeseed & mustard, niger and sesamum) from various issues of publications, such as "Agricultural Statistics", published by the Directorate of Agriculture, Government of M.P., Bhopal (1980-81 to 1997-1998) and "The Basic Agricultural Statistics" (1980-81 to 1997-1998) published by the Commissioner, Land Records and Settlement, Gwalior, Madhya Pradesh, and from the website www.agridept.cg.gov.in/agriculture/kharif.htm (1998-99 to 2010-11).

Result and Discussion

The present study uses MS-Access-2007 developed by Microsoft Corporation, which is based on RDBMS only. Various tables can be connected using a unique id for each table. Thus, this study has been organized into 3 different steps:

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Creating the Database Tables

The Tables of database contain data on various aspects; the main components of tables are two-fold. One, being the Fields created across columns with certain attributes of the data type to be stored, the other being Records across rows representing different cases or individuals on whom different data are collected. Here, nine tables have been created, namely, “Crop”, “District”, “Season”, “Period code” “Year code”, “Period year code”, “Year”, “Primary Table” and “Secondary Table”. The secondary table was prepared by designing data entry forms, where Primary table was used for drop-down values of crops, districts and year concerned, using their mutual relational integrity. Thus, the secondary data table contained the complete set of data used for further query and analyses.

Designing Forms for Data Input

A form is designed in a separate window based on a given table or query, whose fields are laid out in the forms for a given record. Thus, data entry for all fields can be done with convenience pertaining to a given record or case at a time. A form is more user friendly for data entry than entering data directly into tables or query based tables. Here, two forms have been created, namely, “F-Primary form” for data entry of different crops, districts and years while “F- Secondary sub-form” for data entry of area, production and productivity. The latter sub-form is nested within the primary form for data entry of area, production and productivity of different crops for a given combination of crop, district, year, season, period code, year code, period year code contained in the primary form based on the designed relation among the relevant fields, such that the secondary table finally stores all the data for area, production and productivity along with crop, district, year, season, period code, year code, period_year code automatically due to relational structure among these variables created in the database.

Building Queries to Access Specific Data

Queries are the real work horses in a database, and can perform many different functions as per the requirement (*i.e.*, query) of a specific question to be answered. Thus, their most common function is to retrieve specific data from the tables of the database in a readable format according to the user's request. This study involves creation of two queries, one for the work horse to be used behind the main form “F-Primary Form” and the other for using as a work horse behind the “F-Secondary subform” nested within the former, to finally create “Q-Secondary Table Query” using the relational structure among the variables crop, district, year, season, period code, year code, period_year code. These data were then exported as CSV files from the query itself for use as data input in the “R: The R Project for Statistical Computing” software for further statistical analyses.

Summary and conclusion

A relational database allows us to easily find specific information using SQL (Structured Query Language) query language built-in with the database. The database of the present study includes Primary tables for Crops, Districts and Year, while a Secondary table contains information on Area, Production and Productivity having relational integrity with Primary table for different crops, district and year.

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crop	season	district	Year	period code	year code	period_year code	area	production	productivity
niger	kharif	bastar	1999	4	4.4		18.5	3.2	172
niger	kharif	bastar	2000	5	1.5.1		18.8	4.4	235
niger	kharif	bastar	2001	5	2.5.2		16.29	3.24	195
niger	kharif	bastar	2002	5	3.5.3		0.06	0.06	1088
niger	kharif	bastar	2003	5	4.5.4		0.07	0.06	800
niger	kharif	bastar	2004	6	1.6.1		0.03	0.03	1280
niger	kharif	bastar	2005	6	2.6.2		0.03	0.04	1364
niger	kharif	bastar	2006	6	3.6.3		0.02	0.03	1622
niger	kharif	bastar	2007	6	4.6.4		0.02	0.03	1313
niger	kharif	bastar	2008	7	1.7.1		12.54	2.62	205
niger	kharif	bastar	2009	7	2.7.2		11.99	2.23	188
niger	kharif	bastar	2010	7	3.7.3		12.19	2.59	213
niger	kharif	bastar	2011	7	4.7.4		11.88	2.4	202
niger	kharif	bijapur	2008	7	1.7.1		0.05	0.01	200
niger	kharif	bijapur	2009	7	2.7.2		0.05	0.01	200
niger	kharif	bijapur	2010	7	3.7.3		0.05	0.01	200
niger	kharif	bijapur	2011	7	4.7.4		0.04	0.01	250
niger	kharif	dantewada	1995	3	4.3.4		0	0	0
niger	kharif	dantewada	1996	4	1.4.1		0	0	0
niger	kharif	dantewada	1997	4	2.4.2		0	0	0
niger	kharif	dantewada	1998	4	3.4.3		0	0	0
niger	kharif	dantewada	1999	4	4.4.4		0.8	0.2	172
niger	kharif	dantewada	2000	5	1.5.1		0.2	0.1	185

Fig 1: Generated Query in MS-Access-2007

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